

**Supplementary
Submission
No 27a**

**CRITICAL TRANSPORT INFRASTRUCTURE SUPPORTING THE WESTERN
SYDNEY INTERNATIONAL AIRPORT AND WESTERN SYDNEY
AEROTROPOLIS**

Organisation: EcoTransit Sydney

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The Benefits of Extending the Sydney Trains' South West Rail Link from Leppington to Western Sydney Airport International Airport Terminal

As Sydney continues to grow, the need for effective and efficient transportation solutions becomes ever more critical. One of the key transportation projects currently near shovel-ready is the extension of the Sydney Trains' South West Rail Link (SWRL) from Leppington to the upcoming Western Sydney Airport International Terminal (WSA).

This proposed extension offers numerous advantages over the alternative plan of replacing the existing Sydney Trains line between Glenfield and Leppington with a Sydney Metro service. Here, we explore the multiple benefits of extending the SWRL to Western Sydney Airport International Terminal, with an emphasis on eco-transit principles, alongside economic, social, and logistical considerations.

Economic Benefits

Cost-Effectiveness: Extending the SWRL is highly a cost-effective solution compared to converting the existing 8-carriage heavy rail service to a 3-carriage Sydney Metro service. Converting the line would necessitate substantial infrastructure changes, such as modifying platforms, updating signalling systems, and acquiring new rolling stock. These modifications would require significant investment, potentially diverting funds from other essential infrastructure projects. By contrast, extending the current rail line from Leppington involves less disruptive and more financially prudent adjustments.

Boost to Local Economy: Extending the SWRL to WSA would provide direct rail access to a major employment hub, facilitating the movement of workers and boosting the local economy. Enhanced connectivity in Western Sydney encourages investment in the region and supports the growth of local businesses. Improved access to the airport can also stimulate developments in tourism and related industries, further driving economic growth.

Social Benefits

Enhanced Connectivity: The extension of the SWRL would significantly improve connectivity for residents of Western Sydney. Direct access to the WSA would provide residents with a convenient and efficient transportation option, reducing travel times and enhancing their overall quality of life. It would also link key regions such as Liverpool and other parts of South West Sydney fostering greater social cohesion and accessibility.

Equitable Transport Solutions: Maintaining and extending the heavy rail system ensures that the existing infrastructure remains accessible to all, including people with disabilities, the elderly, and those with prams or bicycles. Sydney Trains are designed with more spacious carriages and seating arrangements, making them more comfortable and accessible compared to the more compact metro services.

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Environmental Benefits

Promotion of Eco-Transit: Extending the SWRL aligns perfectly with key eco-transit principles by encouraging the use of public transportation over private cars, thus reducing traffic congestion and lowering carbon emissions. Rail transport is one of the most environmentally friendly modes of transportation, and the SWRL extension would likely increase the public's reliance on sustainable transport options.

Reduced Carbon Footprint: The extension of the SWRL would promote a shift from car travel to rail travel, which is significantly more energy-efficient and environmentally friendly. Conversion of the SWRL into Sydney Metro will discourage uptake in rail as commuters seek to avoid the forced interchange at Glenfield Station. The extension of the SWRL supports the wider need to reduce greenhouse gas emissions and combat climate change. The increased use of rail transport over personal vehicles would lead to lower overall emissions, contributing to a cleaner and greener city.

Preservation of Green Spaces: By extending an existing rail line rather than converting it to Sydney Metro, the project also minimises environmental disruption. Using the current infrastructure reduces the need for extensive construction activities that can lead to habitat destruction and increased pollution. This approach supports the conservation of green spaces and reduces the ecological footprint of the project.

Logistical and Operational Benefits

Seamless Integration with Existing Network: Extending the SWRL would ensure seamless integration with the existing Sydney Trains network. Passengers would benefit from direct services to and from the new airport without needing to transfer between different rail systems. This direct connectivity is particularly beneficial for airport travellers, who often have luggage and require straightforward, hassle-free transit options.

Capacity and Frequency: While Sydney Metro has been promoted as having a higher frequency (which is only achievable due to a lag in Sydney Trains receiving digital signalling upgrades which would enable the same frequency), they do not match the capacity needs for longer distances or routes serving major transport hubs like airports. The SWRL extension can leverage the larger capacity of Sydney Trains, ensuring that the service can handle peak passenger loads, particularly during events or holiday travel periods.

Futureproofing: Extending the SWRL would be more adaptable to future needs and expansions. The traditional rail network offers greater flexibility for future extensions and modifications, ensuring that it can evolve alongside the city's growth and changing transportation demands. Future needs and expansions can also include interoperability of the line with freight and Tram-Trains. This adaptability can be crucial in a rapidly growing metropolitan area like Sydney.

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Addressing Potential Concerns

Mitigating Disruptions: Some may argue that extending the SWRL could lead to disruptions during construction. However, such disruptions can be managed through careful planning and phased construction, minimising impacts on existing services. Moreover, the long-term benefits of enhanced connectivity and economic growth far outweigh the temporary inconveniences.

Balancing Investments: Critics of extending the SWRL may point to the high initial costs. However, when considering the lifecycle costs, including maintenance and operational efficiency, extending the SWRL proves to be a more sustainable investment. Additionally, the cost savings from avoiding a full metro conversion can be redirected towards other essential infrastructure projects, benefiting the broader community.

Conclusion

Extending the Sydney Trains' South West Rail Link from Leppington to Western Sydney Airport International Terminal presents a compelling case with multifaceted benefits. Emphasising eco-transit principles, this extension supports sustainable transportation, economic growth, and social equity. It also offers environmental sustainability and operational efficiency, aligning with the strategic goals of creating a well-connected, green, and inclusive transportation network for Sydney.

While replacing the existing Sydney Trains line with a Sydney Metro service may offer the impression of an upgrade, the extension of the SWRL provides a balanced and future-proof solution that supports the region's long-term development and meets the immediate needs of its residents. As Sydney prepares for the future, prioritising the extension of the SWRL to Western Sydney Airport International Terminal stands out as a strategic and beneficial choice.

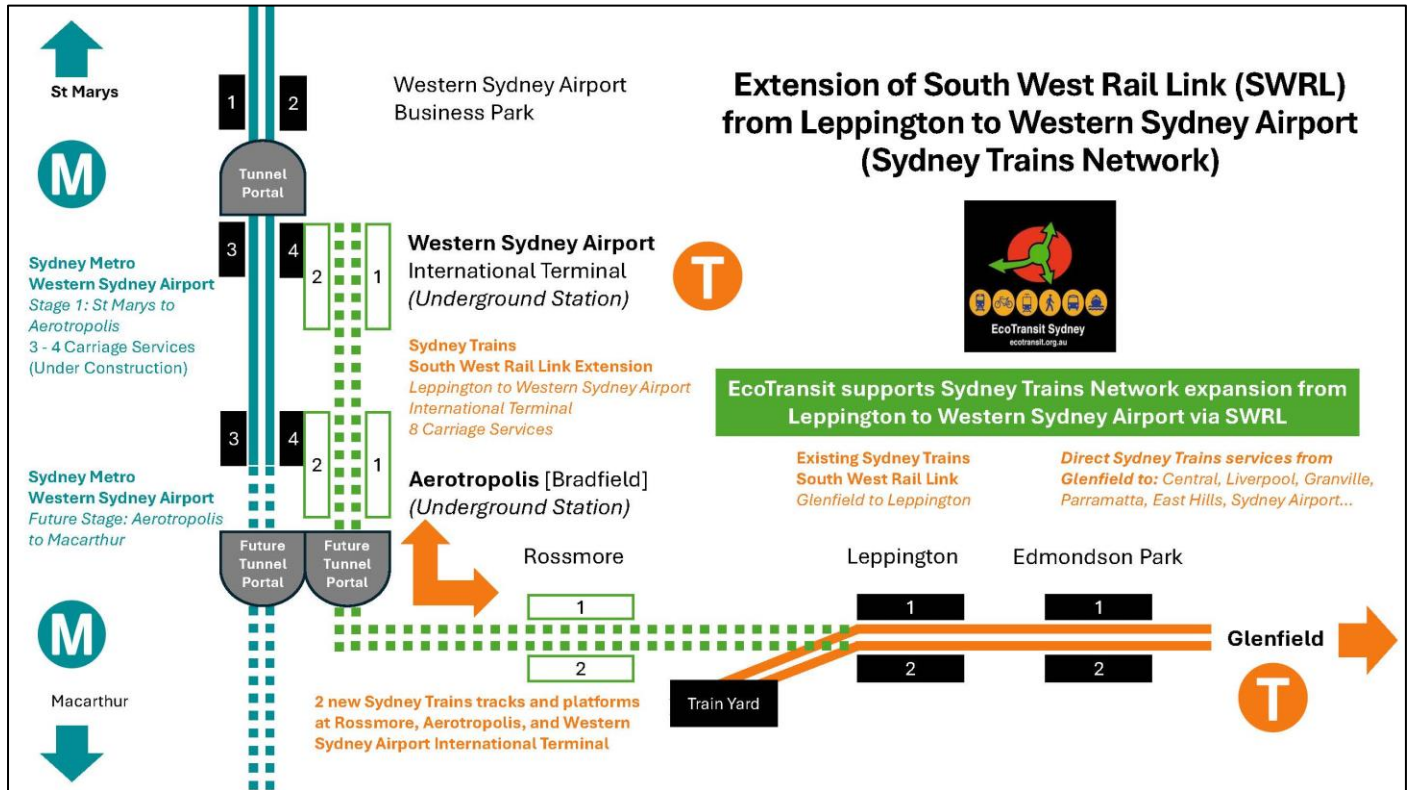
Recommendations

- Immediate suspension of construction of Sydney Metro – Western Sydney Airport line (Stage 1) for the Western Sydney Airport International Terminal Station, Aerotropolis Station, and the rail corridor in between both stations pending the outcome of this Inquiry into Critical Transport Infrastructure supporting the Western Sydney International Airport and Western Sydney Aerotropolis.
- Western Sydney Airport International Terminal station, Aerotropolis Station, and the rail corridor in between both stations be redesigned for 4 rail tracks (2 Sydney Metro from St Marys & 2 Sydney Trains to Leppington) as part of futureproofing the benefits of extending the South West Rail Link as Sydney Trains (heavy rail) and thus enhancing network operational flexibility.
- Western Sydney Airport International Terminal to have direct Sydney Trains services to City Circle via T2 Liverpool and Granville, and direct Sydney Trains services to City Circle via T8 East Hills and Sydney Airport.

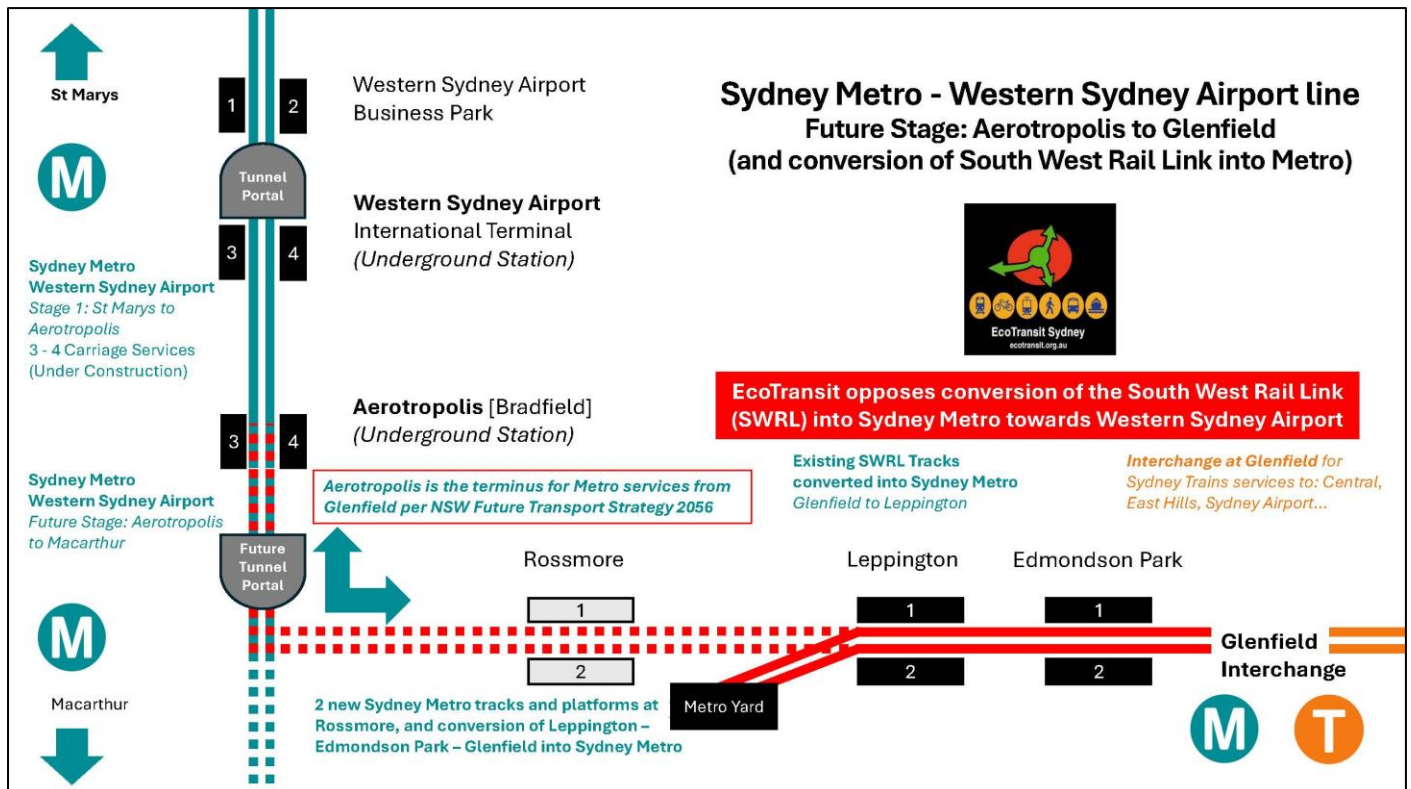
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Refer to [EcoTransit's submission](#) for a proposed Sydney Trains service plan for Western Sydney Airport.





Transforming Sydney’s Rail Network: New Australian-Made Tram-Trains

Sydney the vibrant capital of New South Wales, is on the cusp of a significant upgrade to its public transportation system. The introduction of new Australian-made Tram-Trains promises to revolutionise the city's rail network, enhancing efficiency, connectivity, and overall commuting experience.

These innovative vehicles, designed to operate seamlessly on both tram and train tracks, represent a leap forward in urban transport. They offer numerous benefits and pave the way for the standardisation of Sydney Metro and Sydney Light Rail into a unified, single-deck Tram-Train fleet.

Bridging the Gap Between Trams and Trains

One of the most significant advantages of Tram-Trains is their versatility. Traditional trams are typically confined to urban streets, while trains run on dedicated rail lines. Tram-Trains, however, are designed to operate on both types of infrastructure.

This dual capability means they can provide continuous, direct journeys from suburban areas into the city centres without requiring passengers to transfer between different modes of transport. This integration reduces travel time and increases convenience, making public transport a more attractive option for commuters.

Enhanced Connectivity and Accessibility

The introduction of Tram-Trains will significantly enhance connectivity across Sydney’s diverse inner and outer suburban communities. These vehicles can serve areas currently underserved by the existing rail network, effectively extending the reach of public transportation. By linking suburban rail lines with inner-city tram networks, Tram-Trains create new, direct routes that can reduce congestion on major lines and provide faster, more efficient travel options.

Moreover, Tram-Trains can navigate tighter turns and steeper gradients compared to traditional trains, allowing them to serve areas with challenging topography. This flexibility ensures that more communities, including those in hilly or densely built regions, have access to reliable and efficient public transport.

Economic and Environmental Benefits

The production of these Tram-Trains in Australia is set to bring substantial economic benefits. Local manufacturing supports Australian jobs and stimulates the economy by investing in domestic industries. By producing these vehicles locally, Sydney can ensure a supply chain that is less dependent on international suppliers, fostering economic resilience and promoting technological innovation within the country.

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From an environmental perspective, Tram-Trains offer significant advantages over private vehicles. By providing an efficient and attractive alternative to car travel, they can help reduce traffic congestion and lower greenhouse gas emissions.

Electric Tram-Trains, in particular, produce zero emissions at the point of use, contributing to cleaner air and a reduction in the city's overall carbon footprint. Additionally, their ability to operate on existing tracks means that less new infrastructure is required, minimising the environmental impact of expanding the network.

Improving the Commuter Experience

The commuter experience in Sydney is set to improve dramatically with the introduction of Tram-Trains. These modern vehicles are designed with passenger comfort and convenience in mind. Features such as low floors for easy boarding, spacious interiors, and advanced passenger information systems ensure a pleasant and efficient journey. The reduction in the need for transfers also means that commutes will be more straightforward and less stressful, encouraging more people to choose public transport over driving.

Standardising Sydney Metro and Sydney Light Rail

The potential for standardising the Sydney Metro and Sydney Light Rail fleets into a unified, single-deck Tram-Train system is a visionary step towards an integrated transport network. Standardisation can bring about numerous benefits:

- Operational Efficiency:** A unified fleet reduces maintenance complexity and operational costs. Maintenance crews can be trained to service a single type of vehicle, and spare parts inventory can be streamlined. This efficiency translates into cost savings and more reliable service.
- Passenger Convenience:** A standardised system ensures uniformity in service levels, vehicle design, and passenger experience. This consistency can make the system more user-friendly, as passengers will encounter the same type of vehicle and facilities across different routes. This predictability can enhance the overall travel experience and encourage more people to use public transport.
- Flexibility and Scalability:** A standardised fleet can easily be scaled to meet growing demand. New vehicles can be added without the need for extensive modifications to the existing infrastructure. This flexibility ensures that the transport network can adapt to population growth and changing travel patterns.
- Improved Planning and Development:** With a single type of vehicle in use, urban planners and developers can better design and integrate public transport into city layouts, optimising routes and station placements for maximum efficiency. This integration can lead to more cohesive urban development and better land use planning.

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The transition to a unified Tram-Train fleet also presents an opportunity for technological upgrades. Features such as real-time tracking, automated controls, and advanced safety systems can be uniformly implemented across the network, enhancing overall service quality and reliability.

Supporting Australian Manufacturing and Innovation

Producing Tram-Trains in Australia is not only economically beneficial but also importantly supports local innovation. The development and production of Tram-Train vehicles can spur key advancements in transportation technology, positioning Australia as a new leader in the global industry. Investment in local manufacturing can also lead to the creation of a skilled workforce, boosting employment and fostering expertise in high-tech industries.

Furthermore, a domestically produced fleet ensures that Sydney's transportation infrastructure is tailored to local conditions and requirements. This customization can lead to better performance and longevity of the vehicles, as they are designed to meet the specific needs of the city's climate, geography, and passenger demographics.

Plans for the Tram-Train can include expanding the network to other cities and regions across Australia. There is also potential for exporting the technology to other countries facing similar urban transport challenges.

EcoTransit campaign for Australian made Tram-Trains

NSW has had enough of its Government buying public transport vehicles 'off-the-shelf' from overseas, which aren't fit for purpose! The costs of converting these foreign-built vehicles debunk the economic rationale of buying them 'cheaply' in the first place.

NSW now has THREE types of foreign-sourced passenger rail vehicles, and all have had problems upon arrival or soon after.

EcoTransit wants to uncomplicate this mess and is encouraging the government to switch away from both foreign-sourced automated metro carriages and standard light rail vehicles. We want an all-in-one, locally built, single-deck 'Tram-Train' vehicle to replace both of these to ensure equal functionality and greater compatibility with our existing rail networks.

Locally made Tram-Trains would not only work in our existing metro tunnels and our current light rail tracks – they are also able to provide long-term sustainable jobs and quality single-deck rail vehicles for passengers which are fit-for-purpose - first time, every time.

Please see [EcoTransit's letter campaign for Locally Made Tram-Trains](#) for more information.



Case Studies: Tram-Trains in Other Global Cities

To understand the potential impact of Tram-Trains in Sydney, it is useful to look at how similar systems have been implemented in other cities of comparable size. Several European cities have successfully integrated Tram-Trains into their public transportation networks, providing valuable insights.



LEFT: Tram-train running on a street-level tram track in Heilbronn, Germany

RIGHT: The same tram-train carriage operating on standard heavy rail tracks, with low-lying platforms.

Karlsruhe, Germany: Karlsruhe is often cited as a pioneering city in the use of Tram-Trains. The Karlsruhe model allows Tram-Trains to run on both city tram lines and regional railway tracks. This system has significantly improved connectivity between suburban and urban areas, reducing travel times and increasing the convenience of public transport. The success of the Karlsruhe model has inspired other cities to adopt similar systems.

Mulhouse, France: Mulhouse has implemented a Tram-Train system that connects the city centres with surrounding suburban areas. This integration has provided a seamless travel experience for commuters, encouraging more people to use public transport instead of private cars. The Tram-Trains in Mulhouse have been praised for their efficiency and reliability, contributing to reduced traffic congestion and lower emissions.

Sheffield, UK: In Sheffield, Tram-Trains connect the city centres with nearby towns, utilising both tram tracks and existing railway lines. This system has improved regional connectivity and provided an efficient alternative to car travel. The introduction of Tram-Trains in Sheffield has been part of a broader strategy to enhance public transport infrastructure and reduce the city's carbon footprint.



Vossloh car for Sheffield-Rotherham Tram-Train in Yorkshire (United Kingdom)

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These case studies highlight the potential benefits of Tram-Trains in terms of improved connectivity, reduced travel times, and enhanced passenger convenience. They also demonstrate the environmental advantages of reducing reliance on private cars and lowering greenhouse gas emissions.

The new Australian Tram-Train

EcoTransit suggests consideration for the new Australian Tram-Train for Sydney to be modelled upon the Melbourne E-class tram, built in Victoria from 2013 to 2021 (with some imported components) by Bombardier/Alstom. Other options include Stadler which could be built locally with a large order and an ongoing demand for product.



Melbourne E class, Bombardier's "Flexity Swift" and similar car in Karlsruhe (Germany)



Stadler Citylink car for Szeged Tram-Train operation in Hungary

Two compulsory features for all Tram-Train services would be low floor (for accessibility) and pivoting trucks. Couplers are concealed by the lower-end fairing and bumper for safer street operation. Pending sufficient demand and an enabling tender process, companies such as Stadler could build Tram-Trains in Australia. There are also similar offerings from builders such as Skoda, CRRC, and CAF.

This type of Tram-Train (also available from other builders as well) would also be suitable for all of Sydney City and South East, Newcastle, and also Parramatta Light Rail lines. EcoTransit suggests that all Tram-Train and light rail lines utilise overhead wiring to improve operational reliability. Dependency

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on APS “feeding via the ground” for power supply is comparatively unreliable and has high maintenance costs.

The Tram-Train rolling stock would have the smallest dynamic envelope being the Standard 2.65m wide Light Rail Vehicle enabling a high degree of interoperability (such as existing Light Rail, Sydney Trains or Sydney Metro). For compatibility with on-street running and operations at-grade right-of-way low floor cars are necessary, Sydney Metro stations would need to be rebuilt with low platforms.

Modifications to heavy rail platforms can include a low-level platform that can be added either opposite the high platform or at the end. Modifications to platforms at existing stations are a small cost to ensure Sydney’s rail network is interoperable and futureproofed.

Were platform modifications to existing Sydney Trains and Sydney Metro lines be viewed as an inhibiting factor, EcoTransit proposes that all future single-deck fleets be constructed to the same Tram-Train specifications to ensure an end to the messy and disgraceful segregation of Sydney’s rail network.

Australian-made Tram-Trains should be given a fair go!

Eco-Transit Benefits of Tram-Trains

Tram-Trains offer significant environmental benefits, making them a key component of eco-transit strategies. Here are some of the eco-transit benefits of Tram-Trains:

1. **Reduced Greenhouse Gas Emissions:** Tram-Trains, especially electric models, produce zero emissions at the point of use. By shifting commuters from cars to Tram-Trains, cities can significantly reduce their overall greenhouse gas emissions. This reduction is crucial for cities like Sydney, which are committed to meeting climate change targets and improving air quality.
2. **Energy Efficiency:** Tram-Trains are highly energy-efficient compared to other forms of transport. They can carry large numbers of passengers while consuming less energy per kilometre travelled. This efficiency is further enhanced when Tram-Trains use renewable energy sources, such as solar or wind power, to power their operations.
3. **Reduced Traffic Congestion:** By providing an attractive and efficient alternative to car travel, Tram-Trains can help reduce traffic congestion in urban areas. Fewer cars on the road lead to lower emissions, less noise pollution, and improved overall quality of life for city residents.
4. **Sustainable Urban Development:** The integration of Tram-Trains into urban planning encourages sustainable development practices. By promoting higher-density, transit-oriented development, cities can reduce urban sprawl, preserve green spaces, and create more liveable communities.

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5. **Lower Infrastructure Costs:** Tram-Trains can operate on existing railway and tram tracks, reducing the need for extensive new infrastructure. This not only minimises environmental disruption but also lowers the financial costs associated with expanding the transport network.

Future-Proofing Sydney's Transport Network

Looking ahead, the flexibility and adaptability of Tram-Trains make them a future-proof solution for Sydney's evolving transportation needs. As the city continues to grow, the demand for efficient, reliable, and sustainable public transport will only increase. Tram-Trains provide a highly flexible and scalable solution that can be expanded and adapted as needed, ensuring that Sydney's rail network can meet the demands of the future.

The introduction of new Australian-made Tram-Trains is poised to bring a multitude of benefits to Sydney's rail network including in Western Sydney Parkland City. By bridging the gap between trams and trains, enhancing connectivity, and offering economic and environmental advantages, these innovative vehicles represent a forward-thinking approach to urban transportation.

As Sydney prepares to welcome this new addition to its transport system, residents can look forward to a more efficient, accessible, and enjoyable commuting experience.

EcoTransit's proposed Tram-Train Routes for Western Parkland City:

- Parramatta to Western Sydney Airport (former Parramatta Light Rail) via Greystanes then T80 route then Western Sydney Freight Line and/or Fifteenth Avenue.
- Parramatta to Western Sydney Airport (former Metro West) via South Wentworthville on T80 route then Western Sydney Freight Line and/or Fifteenth Avenue.
- Bankstown to Western Sydney Airport via Western Sydney Freight Line.
- Liverpool to Western Sydney Airport and Aerotropolis via T80 route then Fifteenth Avenue.

Refer to [EcoTransit's submission](#) for the proposed Tram-Train routes towards Western Sydney Airport.

Tram-Train from Parramatta to Epping via Carlingford

Carlingford Line: The former T6 Carlingford Line is being converted into Parramatta Light Rail (Stage 1) and involves removing the connection at Clyde, with services instead running through Parramatta to Westmead. Carlingford Line commuters travelling towards Sydney CBD will have to interchange at Parramatta Station (requiring a 200-300 metre walk from Light Rail stop). Then, after joining a city-bound train, they will travel past Clyde, resulting in a 20-30 minute increase in journey time. Such changes to the Carlingford Line will discourage public transport usage and increase dependency on cars once again increasing congestion and pollution.

EcoTransit proposes Tram-Trains as used in several European cities including Karlsruhe (Germany) and more recently Sheffield (United Kingdom). Tram-Trains can and do share heavy rail lines with passenger,

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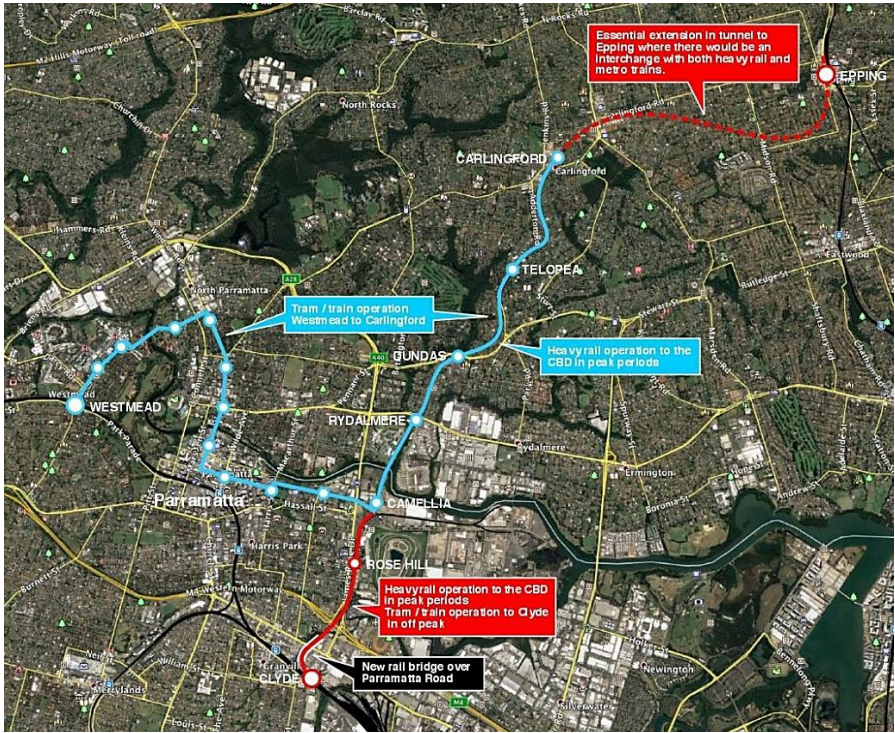
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freight and even highspeed passenger trains; they also run on light rail/tram on-street operations through towns and cities. Our plan includes building a rail bridge over Parramatta Road to replace the existing level crossing; this can be achieved with a ruling gradient of 1 in 80 and there is sufficient space on the rail route. Tram-Trains would operate from Carlingford to Clyde, providing existing connections, and in the morning peak, there would be at least three heavy rail double-deck trains operating from Carlingford through to the city. In the afternoon peak, the same number of trains would operate from the city to Carlingford.



Tram-Trains in Karlsruhe (Germany) and Nantes (France)

The Tram-Trains would also operate the new line through Parramatta and to Westmead. EcoTransit also proposes that the line be extended from Carlingford to Epping, providing a connection with the heavy rail line and the North West Metro. This extension of Parramatta Light Rail (as Tram-Trains) would also remove the need for the New Cumberland Line (T5 bypassing the Y-Link and diverting into new tunnel from Merrylands to Parramatta to Carlingford to Epping).



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Conclusion

The introduction of new Australian-made Tram-Trains will revolutionise Sydney’s public transportation system. By bridging the gap between trams and trains, enhancing connectivity, and offering substantial economic and environmental benefits, these innovative vehicles represent a significant advancement in urban transport.

The potential standardisation of Sydney Metro and Sydney Light Rail into a single-deck Tram-Train fleet promises to further streamline operations, improve passenger experience, and future-proof the city’s transport network.

By examining successful implementations of Tram-Trains in cities like Karlsruhe, Mulhouse, and Sheffield, Sydney can learn valuable lessons and anticipate the positive impacts of this transformation.

The eco-transit benefits of Tram-Trains, including reduced greenhouse gas emissions, energy efficiency, and sustainable urban development, align with Sydney’s goals of creating a more sustainable and liveable city.

As Sydney embraces this transformative change, residents and visitors alike can anticipate a more efficient, accessible, and sustainable commuting experience. The integration of Tram-Trains into Sydney’s transport network is not just an upgrade; it is a visionary step towards a modern, cohesive, and environmentally friendly urban mobility solution.

Recommendations

- A feasibility study be undertaken into the conversion of all Sydney single-deck rail fleets and operations into Australian-made Tram-Trains in lieu of new rail extensions especially in Western Sydney from Parramatta LGA, Cumberland LGA, Canterbury-Bankstown LGA, Liverpool LGA, and Western Parkland City (including Western Sydney Airport and Aerotropolis).
- All Sydney Metro – Western Sydney Airport line stations (Stage 1 & 2) be constructed to full eight carriage lengths for futureproofing (e.g. conversion into Sydney Trains and/or potential Tram-Trains).
- An independent review of the NSW Future Transport Strategy (with public consultation) to increase capacity on the Sydney Trains Network, especially for the T2 Inner West (Parramatta), and Liverpool via Regents Park) and Leppington/WSA Line, T3 Bankstown Line (Lidcombe to Bankstown, and Liverpool to Bankstown), T5 Cumberland Line, and T8 Sydney Airport/WSA and South Line.